Identifying Hazardous Environmental Exposures During Pregnancy____

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BACKGROUND

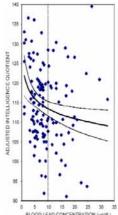
EPA is working with other federal agencies, health professional associations, academia, and health care providers on a pregnancy and environmental health project. The objectives of this project are to identify possible environmental exposures which can be hazardous to a mother and her developing fetus, and to develop messages for individuals, particularly women of childbearing age, that provide information including practical tips for reducing exposure. There is a clear relationship between a mother's environment and the health of her developing child. 20,26 Analysis of the literature reveals some key environmental exposures. Understanding more about the links between the environment and pregnancy, and providing information and options for behavioral change will aid in mobilizing communities and individuals to promote healthy pregnancies.

Lead exposure can cause a range of health effects-fetuses and young children are most susceptible. The main sources of exposure are lead-based paint, contaminated soil and dust, and occupational exposure. Exposure to high levels of lead has been associated with exposure. Exposure to high reversion read has been associated with spontaneous abortion, premature rupture of fetal membranes, preterm delivery and impaired mental development. 7. 8, 28, 13, 20 Even low levels of exposure may result in subtle learning and behavioral problems in children20(Figure 1).

Practical Tips

- To reduce risk of hazardous Pb exposure:
- •Have your home tested for lead if it was built before 1978.
 •Avoid exposure to chipping or peeling paint.
- •Don't try to remove paint yourself; temporarily move out of your home until the remediation is done and the house is properly cleaned. •Eat foods rich in calcium and vitamin C to help reduce the harmful

Figure I. Parial residual plot of the effect of 3rd trimester maternal BPb (thin lines: 95 percent confidence interval) on Full Scale IQ at 8 years of age. *Adjusted for maternal IQ, gender, brith weight, socioeconomic status, and bloot falled thevels at other prenatal and pointantal ages. This figure illustrates the log-linear association between least and toldin affiliagence, infacing that two-others of the deferious effects of faced on child IQ occur when third trimester lead concentrations rise from 1 to 10 grid.—which is the current CDE BPd of concerv. The log-linear does receptone curve of lead. IQ suggests that current national and international standards do not prevent most of the damaging effects of lead on intellectual development of history.



HOUSEHOLD CLEANING PRODUCTS & SOLVENTS

Some household cleansers contain organic solvents (chemicals that dissolve other substances). Common organic solvents include alcohols, degreasers (such as some oven cleaners), paint thinners and varnish removers, lacquers, silk-screening inks and paints also contain these chemicals 2-5.20,26 Women who are occupationally exposed to solvents during the first trimester of pregnancy are more likely than unexposed women to miscarry and/or have a baby with a major congenital abnormality.20

Practical Tips

- •There are many safe, natural and effective cleaning alternatives.²⁰ Baking soda can be used as a powdered cleanser to scrub greasy areas, pots and pans and ovens.
- ·A solution of vinegar and water can effectively clean many surfaces such as countertops
- •While creating the nursery, pregnant women can reduce their exposure to solvents by: avoiding painting projects and limiting time in freshly painted rooms; and using water based paints instead of oil-based paints. Water based paints usually emit fewer chemical vapors.

 •Always use the products in a well-ventilated area, wear protective gloves, and nev
- as the fumes may be hazardous to the mother and fetus.

PESTICIDES

Pesticides can disrupt the endocrine,20 immune,2,20 and central nervous systems.26 in the developing fetus. The prudent approach is to reduce or eliminate exposure to pesticides.

Practical Tips for Application

- •If the use of pesticides is required, try to have someone who is not pregnant apply them, and only in needed areas.
- •Only use pesticides with an EPA registration number and that are labeled with directions for use and first-aid. Follow these directions.
- Only use pesticides indoors if approved for indoor use.
- •Try to use bait and traps first.
- Apply the pesticides to cracks, but not to entire floors, walls or ceilings.
- •Do not apply to food preparation areas, and if cabinets have to be treated, remove pots and pans first and wait the prescribed amount of time before replacing them.

 •Wash any surfaces that may have pesticide residues first before placing food on
- •Try to prevent pests in the future by removing standing water, open food and by
- filling cracks and crevices.

 •If you must use a pesticide or herbicide outside, make sure it is not a windy day and that all doors and windows are closed.

Practical Tips that can Reduce Pesticides in Food

- •Trim the fat from meat and poultry because residues of some pesticides concentrate in fat.
- •Remove the skin from fish.
- •Discard the fats and oils in broths and pan drippings.
 •Rinse fruits and vegetables thoroughly with water and scrub them with a brush
- (Table 2). Taking these safety steps will remove most of the existing surface residues, along with any remaining dirt. Note that surface cleaning (rinsing and scrubbing) will not remove pesticide residues that are absorbed into the growing fruit or vegetable before harvest.
- •Cook or bake foods to reduce residues of some pesticides even further. To find more safety information on the use http://www.epa.gov/OPPTpubs/Cit Guide/citguide.pdf of pesticides,

mix cleaning pro	oducts
Table 2. Pesticides in Fruits and Vegetables	
Fresh Fruits and Vegetables Highest in Pesticides	Fresh Fruits and Vegetables Lowest in Pesticides
Apples	Asparagus
Bell Peppers	Avocados
Celery	Bananas
Cherries	Broccoli
Grapes (imported)	Cauliflower
Nectarines	Corn (sweet)
Peaches	Kiwi
Pears	Mangos
Potatoes	Onions

Strawberries Peas (sweet) Adapted from Environmental Working Group 2003.14 Retrieved

Pineapples

MERCURY (Hg) AND FISH

Mercury (Hg) is present in various forms in the environment. Elemental Hg is emitted by various sources, such as a combustion by-product of coal; biological processes transform the emissions into methyl mercury (MeHg). MeHg accumulates in animal tissues, including fish, and contributes to higher tissue Hg levels among fish consumers.¹¹ It's important for women to incorporate certain fish into a healthy diet before, during and after pregnancy because of its nutritional benefits. For most people, the risk from mercury via fish and shellfish consumption is not a health concern; however, women of childbearing age, pregnant women, nursing mothers and young children are more susceptible to the toxic effects of mercury. MeHg crosses the placenta and blood brain barrier. Prenatal exposure to MeHg can cause adverse developmental and cognitive effects in infants. $^{21,\,24,\,32,\,34}$



- Practical Tips

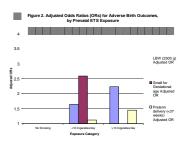
 *The Food and Drug Administration (FDA) and the Environmental Protection Agency (EPA) are advising women and
- young children not to eat fish high in Hg (Table1) and to eat a maximum of 12 ounces/week of fish lower in Hg. 32

 Because albacore ("white") tuna has more Hg than canned light tuna, the advice is to eat up to 6 ounces (one average meal) of albacore tuna per week if tuna is desired.

 The FDA and EPA also advise women and young children to check their local advisories to learn about the safety of
- fish caught by family and friends in local bodies of water. If no local advice is available, consuming up to 6 ounces (one average meal) per week of fish caught in local waters is advised.

ENVIRONMENTAL TOBACCO SMOKE (ETS)

ETS, also known as second hand smoke, is a combination of over 4,000 chemicals, including polycyclic aromatic hydrocarbons (PAHs) and carbon monoxide (CO). Infants born to women who are exposed to environmental tobacco smoke pregnancy may have a decrement in birth weight and a slightly increased risk for intrauterine growth retardation.²⁹ (Figure 2) These infants are also at an elevated risk for deficits in birth length and cognitive functioning (i.e. impaired speech, language skills and intelligence) compared to infants born to women who are not exposed to ETS.29 Research studies estimate that the direct additional health care costs in the United States associated only with birth complications caused by pregnant women smoking or being exposed to secondhand smoke could be as high as \$2 billion per year. 1,19,22,3



•Pregnant women should designate their homes and cars as no smoking zones to substantially reduce the risk of prenatal exposure to ETS.

Pregnant women should also avoid bars or restaurant areas that allow smoking.

EPA has Maximum Contaminant Level (MCL's) for the regulation of numerous contaminants found in public drinking water, including microorganism, disinfectants, disinfectant byproducts, organic and inorganic chemicals and radionuclides. The MCL's are based on adverse health effects as well as other considerations. Some of these regulated pollutants pose a threat for adverse developmental and reproductive outcomes; for example, lead causes neurotoxicity and developmental delays. Other contaminants are known to occur in drinking water but are unregulated at this time. Contaminants in private well water are not regulated by EPA.³⁴

- •Ask for a Consumer Confidence Report from your local public water supplier; or if you have a private drinking water well, have it tested annually by a certified laboratory (EPA).
- •When using water from the tap, use only cold water for drinking and cooking to reduce prenatal exposure to leadcontaminated water.

- CONTAMINATED WATER.

 REFERENCES

 1. Admin E.M., Which C.L. (1992). Cross of macronic conditions untribunable to morning during pregnacy. American Journal of Preventive Medicine 15(3): 212-219.

 1. Admin E.M., Which C.L. (1992). Cross of macronic conditions and produce of the production of the produc

- on April 14, 2006.

 33. U.S. Department of Housing and Urban Development. (2001). Lead paint safety: a field guide for painting, home maintenance, and renovation work. Retrieved from http://www.hale.co/offices/lead/training-LBP-quide_ed/ on April 14, 2006.

 43. U.S. Environmental Protection Agency (EA), (2006). Lost of defining water contaminants and MCLs. Retrieved from http://www.ng.upovioriendes/lbc.hldm.ndv.hundes/lbc.

